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## IMMATURE NORTHERN GOSHAWK CAPTURES, KILLS, AND FEEDS ON ADULT-SIZED WILD TURKEY

GREGORY H. GOLET<sup>1</sup>

*The Nature Conservancy, 500 Main Street, Chico, CA 95928 U.S.A.*

HENRY T. GOLET

*5-1 Binny Road, Old Lyme, CT 06371 U.S.A.*

ALBIE M. COLTON

*19 Burr Road, Lyme, CT 06371 U.S.A.*

**KEY WORDS:** *Northern Goshawk; Accipiter gentilis; Wild Turkey; Meleagris gallopavo; food-niche breadth; predator-prey interaction; sexual size dimorphism.*

The largest prey regularly taken by Northern Goshawks

(*Accipiter gentilis*) are snowshoe hares (*Lepus americanus*) (Squires and Reynolds 1997). Although remains of Wild Turkey (*Meleagris gallopavo*) polts have been reported in goshawk pellets (Bosakowski et al. 1992), we are not aware of any record of a Northern Goshawk killing a full-grown turkey. Here, we document an observation of an immature goshawk killing and feeding on a full-grown juvenile Wild Turkey in Connecticut.

<sup>1</sup> E-mail address: ggolet@tnc.org



Figure 1. A female Northern Goshawk (*Accipiter gentilis*) stands above a yearling Wild Turkey (*Meleagris gallopavo*) that it killed the previous day at Lyme, Connecticut. Photograph (by H. Golet) taken with a Kodak 240 digital camera through a Bushnell Spacemaster spotting scope (20× eyepiece) from ca. 10 meters away.

#### METHODS

The initial attack sequence was observed (by A. Colton) at close range from inside the house. All subsequent observations were made outside with binoculars and a spotting scope (ca. 30 m from the carcass) aimed through a gap in a mountain laurel (*Kalmia latifolia*) thicket. Continuous observation periods were confined to the early mornings of each day, with additional checks on the carcass being opportunistic in nature. It is likely, therefore, that some feeding bouts were missed.

#### RESULTS

On 12 March 2002, at about 0930 H a Northern Goshawk (*Accipiter gentilis*) attacked and killed a Wild Turkey (*Meleagris gallopavo*) at Lyme, Connecticut. The goshawk struck the turkey while it was feeding alone in a small clearing (3 m × 12 m) beneath a backyard bird feeder situated ca. 5 m from a house. The turkey was unaware of the goshawk until the moment of the attack, when a strike on the back drove it to the ground, causing an explosion of feathers. Immediately the turkey rose and ran, head down, toward a nearby (2 m away) mountain laurel thicket that forms the border of the clearing and the adjoining oak/hickory (*Quercus/Carya*) forest. The hawk “rode” the turkey to the edge of the clearing, but then jumped off and gave pursuit by flight. The goshawk pumped its wings rapidly while flying within 1 m of the ground. Approximately 50 m from the location of the original attack the goshawk overtook the turkey, again pouncing upon its back. Meanwhile, a small flock of American Crows (*Corvus brachyrhynchos*) congregated overhead, flying in a tight circle and calling loudly. Pinned to the ground breast down, the turkey beat its wings frantically while the hawk used a kneading action,



Figure 2. The yearling Wild Turkey carcass as it appeared after the first day of being fed upon by the goshawk. Photograph by H. Golet.

repeatedly bending over and straightening up, to drive its talons into its prey. Less than 1 min elapsed from the time the hawk initially struck the turkey until it ceased flapping, unconscious on the forest floor. Shortly after the completion of the kill, the goshawk and nearby crows flew off, perhaps startled by our presence.

Within 1 hr the goshawk returned to feed on the turkey. It crouched virtually motionless for the first 5 min following its return, although at one point it spread its wings (mantling) briefly to obscure the carcass from the view of a Turkey Vulture (*Cathartes aura*) that flew overhead. The goshawk then began to pluck and eat the turkey, which it did for 20 min before flying off. The hawk made no attempt to conceal the turkey by covering it with leaves prior to its departure, although caching behavior has been observed in goshawks previously (Schnell 1958).

The hawk fed on the carcass sporadically over the next three days (Fig. 1), primarily in the early morning, but occasionally at midday and in the early afternoon. On 14 March (day 3) it arrived before 0610 H, and fed for over 1 hr. The hawk consumed much of the dorsal musculature (primarily the iliotibialis and latissimus dorsi) on the back of the turkey, partially exposing the bones of the sternum and pelvic girdle (Fig. 2). At 0615 H on 15 March (day 4), the turkey carcass was found ca. 3 m from its original position. The hawk did not return to the carcass that morning (through 0830 H at least), although it was observed feeding on it at around 1300 H. Sometime after this observation, and before 0600 H on 16 March (day 5), the carcass disappeared from the site, although there was no evidence of it being dragged through the leaves as was the case the day before.

#### DISCUSSION

Our observation suggests that prey biomass and food-niche breadth may be larger for goshawks than has been

previously recognized. We know of no previous record of a goshawk killing a full-grown Wild Turkey, although the remains of turkey poultts have been found in goshawk pellets in the New Jersey–New York Highlands (Bosakowski et al. 1992) and in prey remains on the Kaibab Plateau, Arizona (R. Reynolds pers. comm.). The immature goshawk, which we suggest was a female based on a consultation with R. Reynolds (pers. comm.), likely weighed ca. 1005 g (Mueller et al. 1976), or ca. 4× as much as the yearling female turkey (ca. 3900 g, Eaton 1992). This prey differential is 63% larger than what has been previously recorded for female goshawks (2.4× their mass) based on observations of snowshoe hare (*Lepus americanus*) predation (Squires and Reynolds 1997). The turkey weighed ca. 10× the previously calculated mean goshawk prey masses of 307 g in Oregon (Reynolds and Meslow 1984), 271 g in New Jersey (Bosakowski et al. 1992), 303 g in Connecticut (Bosakowski et al. 1992), and 413 g in Washington (Watson et al. 1998).

Also to our knowledge, this is the first record of a goshawk returning to a prey item over such an extended period (four successive days), although a mule deer (*Odocoileus hemionus*) gut pile left by hunters in Wyoming was visited by a goshawk on two subsequent days (Squires 1995).

The turkey may have been easier to kill because it was a yearling. Goshawks frequently catch young animals (Opdam et al. 1977), which may be more vulnerable to predation than adults, especially in late winter (Cresswell and Whitfield 1994). Although we cannot be certain that being alone increased the susceptibility of the turkey to attack, this is likely, as group living is advantageous in terms of predator avoidance (Pulliam and Caraco 1984).

Adult turkeys are typically preyed upon by mammalian predators (primarily coyotes, [*Canis latrans*]; Wright et al. 1996, Hubbard et al. 1999), although Great Horned Owls (*Bubo virginianus*; Hubbard et al. 1999), have been observed to take turkey hens from night roosts (Wright et al. 1996). Other raptors, including Golden Eagles (*Aquila chrysaetos*; Bent 1937) and Barred Owls (*Strix varia*; Vangilder and Kurzejeski 1995) have also been reported to prey on turkey hens, albeit infrequently.

Goshawks are sexually dimorphic with females typically weighing 20–40% more than males (Squires and Reynolds 1997). This leads to the predictions that females should have wider food niche breadth, and be better buffered against fluctuations in prey availability than males (Optimality Theory; Schoener 1971). Our observation, although of only one prey capture, suggests that female goshawks may indeed have a wider range of prey availability. This contrasts with previous studies conducted during the breeding season that found similar prey sizes among the sexes (Snyder and Wiley 1976, Widén 1989, Boal and Mannan 1996), but is in accord with a recent radiotelemetry study conducted during winter in northern Finland. In the winter study, Tornberg and Colpaert (2001) found that as forest grouse (Tetraonidae)

availability declined, female goshawks switched to preying upon hares, although males did not appear to have this option. Periods of reduced prey availability, such as winter (the season of our observation), may best reveal limits of prey capture that are imposed by body size.

RESUMEN.—En marzo 12 de 2002, cerca de las 0930 H un azor norteño (*Accipiter gentilis*) ataco, mató y seguidamente se alimento de un pavo silvestre (*Meleagris gallopavo*) de primer año, mientras este se alimentaba solo en un pequeño claro (3 m H 12 m) debajo de un alimentador para aves de jardín situado aproximadamente a 5 m de la casa. Aunque se conoce que los azores depredan sobre pavipollos, para nuestro conocimiento, este es el primer registro de que un primal sea atacado. Este encuentro es notable dada la gran diferencia en tamaño entre el depredador y la presa. Se estimó que el pavo era 4 veces mas pesado que el azor, y aun así este fue sometido con relativa facilidad. El gavilán se alimento del cadáver sucesivamente durante 4 días. Las interacciones entre estas dos especies en Nueva Inglaterra pueden ser más comunes ahora que en las décadas pasadas dado que las poblaciones tanto de pavos como de azores parecen haber aumentado.

[Traducción de César Márquez]

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## A HELPER AT THE NEST OF PEREGRINE FALCONS IN NORTHERN JAPAN

TAKASHI KUROSAWA AND REIKO KUROSAWA<sup>1</sup>  
3-1-6 Kojimacho, Chofu, Tokyo 182-0026 Japan

KEY WORDS: *Peregrine Falcon*; *Falco peregrinus japonensis*; feeding; helper; juvenile; territory.

Peregrine Falcons (*Falco peregrinus*) are widely distributed throughout the world, and primarily breed in monogamous pairs that display aggressive territorial behavior around their nest sites (Cade 1982). Despite numerous studies of this species in Europe, North America, and elsewhere (e.g., Cade et al. 1988), information on the ecology of Peregrine Falcons (*F. p. japonensis*) in East Asia is very limited. Cooperative breeding is infrequent in this species (Skutch 1987) with reported exceptions in North America and in France (Spofford 1969, Monneret 1983). Here, we describe an observation of helping at the nest of a Peregrine Falcon in Hokkaido, northern Japan.

### STUDY AREA AND METHODS

We recorded observations on the behavior and the breeding status of Peregrine Falcons for about 120 hr each year from 1993–2002 at a study site on the Etomo Peninsula in Muroran Hokkaido, northern Japan (42°19'N, 140°59'E). Six pairs of non-migratory Peregrines (pairs B to G) occur on a 10-km stretch of vertical cliffs, part of which is more than 100 m in height, along the narrow Etomo Peninsula (1.0–3.5 km in width; Kumagai 1989, Ueta et al. 1995). The six sites fledged 1.1 young ( $\pm 1.1$  SD) per pair per year from 1993–2002. This peninsula is also a major landfall and point of departure for migrating songbirds and raptors, and in 1998 the banding station on the peninsula recorded 57 species of small- to medium-sized land birds (T. Banno pers. comm.), which are suitable prey for Peregrines in Japan (Yamada 2002).

We used 20× binoculars and a 77× spotting scope to make observations. Because no peregrines in Japan have been marked, we attempted to identify individual birds by their characteristic features such as malar patches, ventral marks (Enderson and Craig 1988), favorite look-out perches and behavior toward the observers.

<sup>1</sup> Corresponding author's e-mail address: rkurosawa@nifty.com